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This listing of claims will replace all prior versions, and listings, of claims in the application. An identifier indicating the status of each claim is provided.

Listing of Claims

1. (Original) A data processing apparatus for processing converted data obtained on orthogonal or frequency transform, comprising:

acquisition means for acquiring tap coefficients as found by learning; and

decoding means for decoding said converted data to original data by preset predictive calculations employing said tap coefficients and said converted data.

2. (Original) The data processing apparatus according to claim 1 wherein said decoding means perform linear predictive calculations using said tap coefficients and the converted data to decode the converted data to original data.

3. (Original) The data processing apparatus according to claim 1 further comprising:

storage means for storing said tap coefficients;

said acquisition means acquiring said tap coefficients from said storage means.

4. (Original) The data processing apparatus according to claim 1 wherein said converted data is obtained on orthogonal or frequency transforming said original data followed by quantization.

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5. (Original) The data processing apparatus according to claim 4 further comprising:

dequantizing means for dequantizing said converted data;

said decoding means decoding the dequantized converted data into said original data.

6. (Original) The data processing apparatus according to claim 1 wherein said converted data is said original data at least discrete cosine transformed.

7. (Original) The data processing apparatus according to claim 1 further comprising:

predictive tap extraction means for extracting said converted data used along with said tap coefficients for predicting data of interest in said original data and for outputting the data as prediction taps;

said decoding means executing predictive calculations using said prediction and tap coefficients.

8. (Original) The data processing apparatus according to claim 7 further comprising:

class tap extraction means for extracting said converted data used for assigning said data of interest to one of a plural number of classes and for outputting the data as class tap; and

classifying means for finding the class of said data of interest based on said class tap;

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said decoding means performing predictive calculations using said predictive tap and said tap coefficients corresponding to the class of said data of interest.

9. (Original) The data processing apparatus according to claim 1 wherein said converted data is said original data at least orthogonal or frequency transformed from one preset unit to another;

said decoding means decoding said converted data to said original data from one said preset unit to another.

10. (Original) The data processing apparatus according to claim 1 wherein said tap coefficients are obtained on learning such as to statistically minimize a prediction error of a prediction value of said original data, obtained on preset predictive calculations, using said tap coefficients and said converted data.

11. (Original) The data processing apparatus according to claim 1 wherein said original data is data of a moving picture or a still data.

12. (Original) A data processing method for processing converted data obtained on orthogonal or frequency transform, comprising the steps of:

acquiring tap coefficients as found by learning; and

decoding said converted data to original data by preset predictive calculations employing said tap coefficients and said converted data.

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13. (Currently Amended) A computer-readable recording medium having recorded thereon a program executable by a processor for performing a method for having a computer execute data processing of processing converted data obtained at least on orthogonal or frequency transform; transform, said ~~program including the steps of~~method comprising:

acquiring tap coefficients as found by learning; and

decoding said converted data to original data by preset predictive calculations employing said tap coefficients and said converted data.

14. (Withdrawn) A data processing apparatus for learning tap coefficients used for decoding converted data, obtained at least on orthogonal transform or frequency transform, by predictive calculations, comprising:

generating means for generating pupil data, as pupil, by at least orthogonal or frequency transforming teacher data, as teacher; and

learning means for effecting learning so that prediction errors of prediction values of said teacher data obtained on predictive calculations using said tap coefficients and the pupil data will be statistically minimum, to find said tap coefficients.

15. (Withdrawn) The data processing apparatus according to claim 14 wherein said learning means executes learning so that a prediction error of the prediction value of said teacher data obtained on linear predictive calculations using said tap coefficients and the pupil data will be statistically minimum.

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16. (Withdrawn) The data processing apparatus according to claim 14 wherein said generating means generate said pupil data by orthogonal or frequency transform followed by quantization of said teacher data.

17. (Withdrawn) The data processing apparatus according to claim 14 wherein said generating means generate said pupil data by orthogonal or frequency transform, followed by quantization and dequantization, in this order, of said teacher data.

18. (Withdrawn) The data processing apparatus according to claim 14 wherein said generating means generate said pupil data at least by discrete cosine transforming said teacher data.

19. (Withdrawn) The data processing apparatus according to claim 14 further comprising:

prediction tap extracting means for extracting said pupil data used along with said tap coefficients for predicting the teacher data of interest in said teacher data and for outputting the extracted pupil data as prediction taps;

said learning means executing learning so that a prediction error of the prediction value of said teacher data obtained on linear predictive calculations using said prediction taps and tap coefficients will be statistically minimum.

20. (Withdrawn) The data processing apparatus according to claim 19 further comprising:

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class tap extracting means for extracting said pupil data used for assigning said teacher data of interest to one of a plural number of classes and for outputting the data as class tap; and
classifying means for finding the class of said teacher data of interest based on said class tap;

said learning means effecting learning so that a prediction error of the prediction value of said teacher data obtained on predictive calculations using said prediction taps and said tap coefficients will be statistically minimum to find said tap coefficients on the class basis.

21. (Withdrawn) The data processing apparatus according to claim 14 wherein said generating means performs at least the orthogonal transform or frequency transform from one said preset unit to another to generate said pupil data.

22. (Withdrawn) The data processing apparatus according to claim 14 wherein said teacher data is a moving picture or a still picture.

23. (Withdrawn) A data processing method for learning tap coefficients used for decoding converted data, obtained at least on orthogonal transform or frequency transform, by predictive calculations, comprising the steps of:

generating pupil data, as pupil, by at least orthogonal or frequency transforming teacher data, as teacher; and

effecting learning so that prediction errors of the prediction values of said teacher data obtained on predictive calculations using said tap coefficients and the pupil data will be statistically minimum to find said tap coefficients.

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24. (Withdrawn – Currently Amended) A computer-readable recording medium having recorded thereon a program executable by a processor for performing a method for ~~having a computer execute data processing of~~ processing converted data obtained at least on orthogonal or frequency transform; transform, said ~~program including the steps of~~ method comprising:

generating pupil data, as pupil, by at least orthogonal or frequency transforming teacher data, as teacher; and

effecting learning so that prediction errors of the prediction values of said teacher data obtained on predictive calculations using said tap coefficients and the pupil data will be statistically minimum to find said tap coefficients.

25. (Original) A data processing apparatus for processing converted data obtained on orthogonal or frequency transform, comprising:

acquisition means for acquiring tap coefficients as found by learning; and

calculating means for executing preset predictive calculations using said tap coefficients and the converted data to decode said converted data to original data and to produce processed data which is said original data subjected to preset processing.

26. (Original) The data processing apparatus according to claim 25 wherein said calculating means execute linear predictive calculations using said tap coefficients and the converted data.

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27. (Original) The data processing apparatus according to claim 25 further comprising:

storage means for storing said tap coefficients;

said acquisition means acquiring said tap coefficients from said storage means.

28. (Original) The data processing apparatus according to claim 25 wherein said converted data is obtained on orthogonal transforming or frequency transforming and further quantizing said original data.

29. (Original) The data processing apparatus according to claim 28 further comprising:

dequantization means for dequantizing said converted data;

said calculating means performing predictive calculations using the dequantized converted data.

30. (Original) The data processing apparatus according to claim 25 wherein said converted data is obtained on at least discrete cosine transforming said original data.

31. (Original) The data processing apparatus according to claim 25 further comprising:

prediction tap extraction means for extracting said converted data, among said processed data, used along with said tap coefficients for predicting data of interest, and for outputting the extracted data as prediction tap;

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said calculating means performing predictive calculations using said prediction tap and the tap coefficients.

32. (Original) The data processing apparatus according to claim 31 further comprising:

class tap extraction means for extracting said converted data used for assigning said data of interest to one of a plural number of classes and for outputting the data as class taps; and

classification means for finding the class of said data of interest, based on said class taps, by way of classification;

said calculating means performing predictive calculations using said prediction taps and the tap coefficients corresponding to the class of the data of interest.

33. (Original) The data processing apparatus according to claim 25 wherein said calculating means perform said preset predictive calculations to produce said processed data which is said original data processed for improving the data quality.

34. (Original) The data processing apparatus according to claim 25 wherein said tap coefficients are obtained on effecting learning, using said tap coefficients and the converted data, so that a prediction error of the predicted value of the processed data obtained on executing preset predictive calculations will be statistically minimum.

35. (Original) The data processing apparatus according to claim 25 wherein said original data is picture data of a moving picture or a still picture.

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36. (Original) The data processing apparatus according to claim 35 wherein said calculating means perform said preset predictive calculations to produce said processed data which is said original data processed for improving the picture quality.

37. (Original) The data processing apparatus according to claim 35 wherein said calculating means produces said processed data which is said picture data improved in temporal or spatial resolution.

38. (Original) A data processing method for processing converted data obtained at least on orthogonal or frequency transform, comprising the steps of:
acquiring tap coefficients as found by learning; and
executing preset predictive calculations using said tap coefficients and the converted data to decode said converted data to original data and to produce processed data which is said original data subjected to preset processing.

39. (Currently Amended) A computer-readable recording medium having recorded thereon a program executable by a processor for performing a method for ~~having a computer execute data processing of~~ processing converted data obtained at least on orthogonal or frequency transform, said ~~program including the steps of~~ method comprising:
acquiring tap coefficients as found by learning; and

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executing preset predictive calculations using said tap coefficients and the converted data to decode said converted data to original data and to produce processed data which is said original data subjected to preset processing.

40. (Withdrawn) A data processing apparatus for decoding converted data obtained at least on orthogonal or frequency transform and for learning tap coefficients used for predictive calculations for processing decoded results in a preset fashion, comprising:

quasi-teacher data generating means for processing teacher data as teacher, based on said preset processing, to produce quasi-teacher data;

pupil data generating means for generating pupil data as pupils on at least orthogonal or frequency transforming said quasi-teacher data; and

learning means for effecting learning for statistically minimizing a prediction error of the predicted value of said teacher data obtained on predictive calculations employing said tap coefficients and the pupil data to find said tap coefficients.

41. (Withdrawn) The data processing apparatus according to claim 40 wherein said learning means effects learning so that the prediction error of the prediction value of said teacher data obtained on performing linear predictive calculations employing said tap coefficients and the pupil data will be statistically minimum.

42. (Withdrawn) The data processing apparatus according to claim 40 wherein said pupil data generating means generates said pupil data by orthogonal or frequency transforming and further quantizing said quasi-teacher data.

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43. (Withdrawn) The data processing apparatus according to claim 40 wherein said learning means generates said pupil data by orthogonal or frequency transforming, quantizing and further dequantizing said quasi-teacher data.

44. (Withdrawn) The data processing apparatus according to claim 40 wherein said pupil data generating means generates said quasi-teacher data on at least discrete cosine transforming said quasi-teacher data.

45. (Withdrawn) The data processing apparatus according to claim 40 further comprising:

prediction tap extracting means for extracting said pupil data used along with the tap coefficients for predicting the teacher data of interest in said teacher data and for outputting the extracted data as class taps;

said learning means effecting learning so that a prediction error of the prediction value of said teacher data obtained on performing linear predictive calculations employing said prediction taps and the tap coefficients will be statistically minimum.

46. (Withdrawn) The data processing apparatus according to claim 45 comprising:

class tap extraction means for extracting said pupil data used for assigning said teacher data of interest to one of a plurality of classes, by way of classification, and for outputting the extracted data as class taps; and

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classification means for finding the class of said teacher data of interest based on said class taps by way of classification;

said learning means effecting learning for statistically minimizing a prediction error of the prediction value of said teacher data obtained on performing predictive calculations using said prediction taps and the tap coefficients corresponding to the class of said teacher data of interest to find the class-based tap coefficients.

47. (Withdrawn) The data processing apparatus according to claim 40 wherein said pupil data generating means at least orthogonal or frequency transforms said quasi-teacher data every preset unit to generate said pupil data.

48. (Withdrawn) The data processing apparatus according to claim 40 wherein said quasi-teacher data generating means generates said quasi-teacher data by processing said teacher data in a manner of deteriorating the data quality.

49. (Withdrawn) The data processing apparatus according to claim 40 wherein said teacher data is a moving picture or a still picture.

50. (Withdrawn) The data processing apparatus according to claim 49 wherein said quasi-teacher data generating means generates said quasi-teacher data by processing said picture data in a manner of deteriorating the picture quality.

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51. (Withdrawn) The data processing apparatus according to claim 49 wherein said quasi-teacher data generating means generates said quasi-teacher data which is said picture data deteriorated in temporal or spatial resolution of said picture data.

52. (Withdrawn) A data processing method for decoding converted data obtained at least on effecting orthogonal or frequency transform and for learning tap coefficients used for predictive calculations for processing decoded results in a preset fashion, comprising the steps of:

processing teacher data as teacher, based on said preset processing, to produce quasi-teacher data;

generating pupil data as pupils on at least orthogonal or frequency transforming said quasi-teacher data; and

effecting learning for statistically minimizing the prediction error of the predicted value of said teacher data obtained on predictive calculations employing said tap coefficients and the pupil data to find said tap coefficients.

53. (Withdrawn – Currently Amended) A computer-readable recording medium having recorded thereon a program executable by a processor for performing a method for having a computer execute data processing of decoding converted data obtained at least on orthogonal or frequency transform and of learning tap coefficients used for predictive calculations for processing decoded results in a preset fashion; ~~fashion~~, said program including the steps ofmethod comprising:

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processing teacher data as teacher, based on said preset processing, to produce quasi-teacher data;

generating pupil data as pupils on at least orthogonal or frequency transforming said quasi-teacher data; and

effecting learning for statistically minimizing the prediction error of the predicted value of said teacher data obtained on predictive calculations employing said tap coefficients and the pupil data to find said tap coefficients.

54. (Original) A data processing apparatus for processing encoded data including converted data obtained on at least orthogonal or frequency transform and preset subsidiary information, and for decoding said converted data into original data, comprising:

classification means for assigning data of interest in said original data to one of a plurality of classes, based on said subsidiary information, by way of classification;

acquisition means for acquiring tap coefficients associated with the classes of said data of interest, in class-based tap coefficients as found on learning; and

decoding means for executing preset predictive calculations, using the converted data and said tap coefficients associated with the classes of said data of interest, to decode said converted data into original data.

55. (Original) The data processing apparatus according to claim 54 wherein said decoding means execute linear predictive calculations, using said converted data and the tap coefficients, to decode said converted data to original data.

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56. (Original) The data processing apparatus according to claim 54 further comprising:

storage means for storing said class-based tap coefficients;

said acquisition means acquiring the tap coefficients associated with the class of said data of interest from said storage means.

57. (Original) The data processing apparatus according to claim 54 wherein said converted data is acquired on orthogonal or frequency transforming and further quantizing said original data.

58. (Original) The data processing apparatus according to claim 57 further comprising:

dequantizing means for dequantizing said converted data;

said decoding means decoding said dequantized converted data into said original data.

59. (Original) The data processing apparatus according to claim 57 wherein said subsidiary information is a quantization table used in quantizing said original data.

60. (Original) The data processing apparatus according to claim 54 wherein said converted data is said original data at least discrete cosine transformed.

61. (Original) The data processing apparatus according to claim 54 further comprising:

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prediction tap extracting means for extracting said converted data used along with said tap coefficients in predicting said data of interest and for outputting the extracted data as prediction tap;

said decoding means executing predictive calculations using said prediction taps and the tap coefficients.

62. (Original) The data processing apparatus according to claim 54 further comprising:

class tap extraction means for extracting said converted data used for assigning said data of interest to one of a plurality of classes to output the extracted data as class tap;

said classification means finding the class of said data of interest based on said subsidiary information and the class taps.

63. (Original) The data processing apparatus according to claim 54 wherein said converted data is said original data at least orthogonal transformed or frequency transformed every preset unit; and

wherein said decoding means decodes said converted data into said original data every said preset unit.

64. (Original) The data processing apparatus according to claim 54 wherein said tap coefficients are obtained on effecting learning, using said tap coefficients and the converted data, so that a prediction error of a predicted value of said original data obtained on preset predictive calculations will be statistically minimum.

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65. (Original) The data processing apparatus according to claim 54 wherein said original data is data of a moving picture or a still picture.

66. (Original) A data processing method for processing encoded data including converted data, obtained on at least orthogonal or frequency transform, and preset subsidiary information, and for decoding said converted data into original data, comprising the steps of:

assigning data of interest in said original data to one of a plurality of classes, based on said subsidiary information, by way of classification;

acquiring tap coefficients associated with the classes of said data of interest, in class-based tap coefficients as found on learning; and

executing preset predictive calculations, using the converted data and said tap coefficients associated with the classes of said data of interest, to decode said converted data into original data.

67. (Currently Amended) A computer-readable recording medium having recorded thereon a program executable by a processor for performing a method for ~~having a computer execute data processing of~~ processing encoded data including converted data, obtained on at least orthogonal or frequency transform, and preset subsidiary information, and for decoding said converted data into original data, said ~~program including the steps of~~ method comprising:

assigning data of interest in said original data to one of a plurality of classes, based on said subsidiary information, by way of classification;

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acquiring tap coefficients associated with the classes of said data of interest, in class-based tap coefficients as found on learning; and

executing preset predictive calculations, using the converted data and said tap coefficients associated with the classes of said data of interest, to decode said converted data into original data.

68. (Withdrawn) A data processing apparatus for learning tap coefficients used for decoding converted data, obtained at least on orthogonal transform or frequency transform, by predictive calculations, comprising:

generating means for generating pupil data, as pupil, at least on orthogonal or frequency transforming teacher data as teacher;

classification means for assigning teacher data of interest in said teacher data to one of a plurality of classes, based on the preset subsidiary information used in generating said pupil data in said generating means; and

learning means for effecting learning so that prediction errors of the prediction values of said teacher data obtained on predictive calculations using the tap coefficients corresponding to the classes of said teacher data of interest and pupil data will be statistically minimum to find class-based tap coefficients.

69. (Withdrawn) The data processing apparatus according to claim 68 wherein said learning means effects learning so that a prediction error of the prediction value of said teacher data obtained on linear predictive calculations using said tap coefficients and the pupil data will be statistically minimum.

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70. (Withdrawn) The data processing apparatus according to claim 68 wherein said generating means generates said pupil data on orthogonal or frequency transforming said teacher data and further on quantizing the converted teacher data.

71. (Withdrawn) The data processing apparatus according to claim 70 wherein said subsidiary information is a quantization table used in quantizing said teacher data.

72. (Withdrawn) The data processing apparatus according to claim 68 wherein said generating means generates said pupil data on orthogonal or frequency transforming said teacher data and further on quantizing and dequantizing the data.

73. (Withdrawn) The data processing apparatus according to claim 68 wherein said generating means generates said pupil data at least on discrete cosine transforming said teacher data.

74. (Withdrawn) The data processing apparatus according to claim 68 further comprising:

prediction tap extracting means for extracting said pupil data used along with said tap coefficients for predicting said teacher data of interest and for outputting the extracted data as prediction tap;

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said learning means effecting learning so that a prediction error of the prediction value of said teacher data obtained on linear predictive calculations using said tap coefficients and the pupil data will be statistically minimum.

75. (Withdrawn) The data processing apparatus according to claim 68 further comprising:

class tap extracting means for extracting said pupil data used for assigning said teacher data of interest to one of a plurality of classes by way of classification and for outputting the extracted data as class taps;

said classification means finding the class of said teacher data of interest based on said subsidiary information and said class taps.

76. (Withdrawn) The data processing apparatus according to claim 68 wherein said generating means generates said pupil data at least on orthogonal or frequency transforming said teacher data every preset unit.

77. (Withdrawn) The data processing apparatus according to claim 68 wherein said teacher data is a moving picture or a still picture.

78. (Withdrawn) A data processing method for learning tap coefficients used for decoding converted data, obtained at least on orthogonal transform or frequency transform, by predictive calculations, comprising the steps of:

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generating pupil data, as pupil, at least on orthogonal or frequency transforming teacher data as teacher;

assigning teacher data of interest in said teacher data to one of a plurality of classes based on the preset subsidiary information used in generating said pupil data in said generating means; and

effecting learning so that a prediction error of the prediction value of said teacher data obtained on predictive calculations using the tap coefficients corresponding to the classes of said teacher data of interest and pupil data will be statistically minimum, to find class-based tap coefficients.

79. (Withdrawn – Currently Amended) A computer-readable recording medium having recorded thereon a program executable by a processor for performing a method for having a computer execute data processing of learning tap coefficients used for decoding converted data, obtained at least on orthogonal transform or frequency transform, by predictive calculations, said ~~program including the steps of~~ method comprising:

generating pupil data, as pupil, at least on orthogonal or frequency transforming teacher data as teacher;

assigning teacher data of interest in said teacher data to one of a plurality of classes based on the preset subsidiary information used in generating said pupil data in said generating means; and

effecting learning so that a prediction error of the prediction value of said teacher data obtained on predictive calculations using the tap coefficients corresponding to the classes of said

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teacher data of interest and pupil data will be statistically minimum, to find class-based tap coefficients.

80. (Withdrawn) A data processing apparatus for finding, from converted data based on a preset block as a unit, obtained at least on orthogonal or frequency transforming data in terms of said preset block as a unit, a predicted value of processed data which is said converted data processed in a desired fashion;

acquisition means for acquiring tap coefficients as found on learning;

class tap extraction means for extracting such data of said converted data, used for assigning processed data of interest to one of a plurality of classes, from at least a block other than the block associated with said processed data of interest, by way of classification, and for outputting the extracted data as class taps;

classification means for finding a class of said processed data of interest based on said class tap; and

calculating means for executing preset predictive calculations, using said tap coefficients of the class of said processed data of interest, and said data of said converted data, to find prediction values of said processed data of interest.

81. (Withdrawn) The data processing apparatus according to claim 80 wherein said calculating means uses said tap coefficients and the converted data to effect linear predictive calculations.

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82. (Withdrawn) The data processing apparatus according to claim 80 further comprising:

storage means for storing said tap coefficients;

said acquisition means acquiring said tap coefficients from said storage means.

83. (Withdrawn) The data processing apparatus according to claim 80 wherein said converted data is said data at least discrete cosine transformed.

84. (Withdrawn) The data processing apparatus according to claim 83 wherein said classification means finds the class of said processed data of interest based on the power of DC or AC components of discrete cosine transformed data which is said converted data as said class tap.

85. (Withdrawn) The data processing apparatus according to claim 80 wherein said class tap extraction means extracts said converted data as said class tap from blocks neighboring to a block associated with processed data of interest.

86. (Withdrawn) The data processing apparatus according to claim 80 wherein said class tap extraction means extracts said converted data as said class taps even from the block corresponding to the processed data of interest.

87. (Withdrawn) The data processing apparatus according to claim 80 wherein said tap coefficients are obtained on effecting learning so that a prediction error of a

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prediction value obtained on performing preset predictive calculations using said tap coefficients and the converted data will be statistically minimum.

88. (Withdrawn) The data processing apparatus according to claim 80 wherein said data is picture data of a moving picture or a still picture.

89. (Withdrawn) A data processing method for finding, from converted data based on a preset block as a unit, obtained at least on orthogonal or frequency transforming data in terms of said preset block as a unit, a predicted value of processed data which is said converted data processed in a desired fashion, comprising the steps of:

acquiring tap coefficients as found on learning;

extracting such data of said converted data, used for assigning processed data of interest to one of a plurality of classes, from at least a block other than the block associated with said processed data of interest, by way of classification, and for outputting the extracted data as class taps;

finding a class of said processed data of interest based on said class tap; and

executing preset predictive calculations, using said tap coefficients of the class of said processed data of interest, to find a prediction value of said processed data of interest.

90. (Withdrawn – Currently Amended) A computer-readable recording medium having recorded thereon a program executable by a processor for performing a method for having a computer execute data processing of finding, from such data of converted data based on a preset block as a unit, obtained at least on orthogonal or frequency transforming data in

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terms of said preset block as a unit, a predicted value of processed data ~~which that~~ is said converted data processed in a desired manner, said ~~program including~~ method comprising:

acquiring tap coefficients as found on learning;

extracting such data of said converted data, used for assigning processed data of interest to one of a plurality of classes, from at least a block other than the block associated with said processed data of interest, by way of classification, and for outputting the extracted data as class taps;

finding a class of said processed data of interest based on said class tap; and

executing preset predictive calculations, using said tap coefficients of the class of said processed data of interest, to find a prediction value of said processed data of interest.

91. (Withdrawn)

A data processing apparatus for learning, from converted data based on a preset block as a unit, obtained at least on orthogonal or frequency transforming data in terms of said preset block as a unit, tap coefficients used for finding, by predictive calculations, processed data which is said converted data processed in a desired fashion, comprising:

generating means for generating said block-based converted data as pupil data as pupil in learning;

class tap extraction means for extracting pupil data used for assigning teacher data of interest to one of a plurality of classes, at least from a block other than a block corresponding to said teacher data of interest, with said processed data as teacher data as teacher in learning, and for outputting the extracted data as class taps;

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classification means for finding a class of said teacher data of interest, based on said class taps; and

learning means for effecting learning so that prediction errors of the prediction values of said teacher data obtained on predictive calculations using said class-based tap coefficients and pupil data will be statistically minimum to find said tap coefficients from class to class.

92. (Withdrawn) The data processing apparatus according to claim 91 wherein said learning means effects learning so that a prediction error of the prediction value of said teacher data obtained on linear predictive calculations using said tap coefficients and pupil data will be statistically minimum

93. (Withdrawn) The data processing apparatus according to claim 91 wherein said generating means generates said pupil data at least on discrete cosine transforming said data.

94. (Withdrawn) The data processing apparatus according to claim 93 wherein said classification means finds the class of said teacher data of interest based on the power of DC or AC components of discrete cosine transformed data which is said converted data as said class tap.

95. (Withdrawn) The data processing apparatus according to claim 91 wherein said class tap extraction means extracts said pupil data as said class tap from blocks neighboring to a block associated with teacher data of interest.

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96. (Withdrawn) The data processing apparatus according to claim 91 wherein said class tap extraction means extracts said pupil data as said class taps even from the block corresponding to the teacher data of interest.

97. (Withdrawn) The data processing apparatus according to claim 91 wherein said data is picture data of a moving picture or a still picture.

98. (Withdrawn) A data processing method for learning, from converted data based on a preset block as a unit, obtained at least on orthogonal or frequency transforming data in terms of said preset block as a unit, tap coefficients used for finding, by predictive calculations, processed data which is said converted data processed in a desired fashion, comprising the steps of:

generating said block-based converted data as pupil data as pupil in learning;

extracting pupil data used for assigning teacher data of interest to one of a plurality of classes, at least from a block other than a block corresponding to said teacher data of interest, with said processed data as teacher data as teacher in learning, and for outputting the extracted data as class taps;

finding a class of said teacher data of interest, based on said class taps; and

effecting learning so that prediction errors of the prediction values of said teacher data obtained on predictive calculations using said class-based tap coefficients and pupil data will be statistically minimum to find said tap coefficients from class to class.

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99. (Withdrawn—Currently Amended)

A computer-readable recording

medium having recorded thereon a program executable by a processor for performing a method for ~~having a computer execute data processing of learning~~, from converted data based on a preset block as a unit, obtained at least on orthogonal or frequency transforming data in terms of said preset block as a unit, tap coefficients used for finding, by predictive calculations, processed data which is said converted data processed in a desired fashion, said ~~program including the steps of~~ method comprising:

generating said block-based converted data as pupil data as pupil in learning;

extracting pupil data used for assigning teacher data of interest to one of a plurality of classes, at least from a block other than a block corresponding to said teacher data of interest, with said processed data as teacher data as teacher in learning, and for outputting the extracted data as class taps;

finding a class of said teacher data of interest, based on said class taps; and

effecting learning so that prediction errors of the prediction values of said teacher data obtained on predictive calculations using said class-based tap coefficients and pupil data will be statistically minimum to find said tap coefficients from class to class.

100. (Original)

A data processing apparatus for processing block-based converted data, obtained on applying at least orthogonal transform or frequency transform to data in terms of a preset block as a unit, comprising:

acquisition means for acquiring tap coefficients as found on learning;

prediction tap extraction means for extracting said converted data used for predictive calculations for decoding data of a data block of interest among data blocks, each of which is a

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block of said data, at least from a converted block as a block of said converted data, corresponding to a data block other than the data block of interest, to output the extracted data as prediction taps; and

calculating means for performing preset predictive calculations, using said tap coefficients and prediction taps, to decode the converted data to original data.

101. (Original) The data processing apparatus according to claim 100 wherein said calculating means performs linear predictive calculations, using said tap coefficients and the prediction tap, to decode said converted data to original data.

102. (Original) The data processing apparatus according to claim 100 further comprising:
storage means having said tap coefficients stored therein;
said acquisition means acquiring said tap coefficients from said storage means.

103. (Original) The data processing apparatus according to claim 100 wherein said converted data is said original data at least discrete cosine transformed.

104. (Original) The data processing apparatus according to claim 100 further comprising:
class tap extraction means for extracting said converted data used for assigning data of interest to one of a plural number of classes from data of said data block of interest to output the extracted data as class tap; and

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classification means for finding the class of said data of interest, based on said class tap, by way of classification,

said calculation means performing predictive calculations, using said predictive tap and said tap coefficients corresponding to the class of said data of interest.

105. (Original) The data processing apparatus according to claim 100 wherein said predictive tap extraction means extracts said converted data to be used as said prediction taps from said converted blocks corresponding to data blocks neighboring to said data block of interest.

106. (Original) The data processing apparatus according to claim 100 wherein said predictive tap extraction means extracts said converted data to be used as said prediction tap from said converted block corresponding to said data block of interest and from the converted blocks corresponding to data blocks other than the data block of interest.

107. (Original) The data processing apparatus according to claim 100 wherein said predictive tap extraction means extracts said converted data showing position relationships indicating larger correlation with respect to data of interest among data of said data block of interest as said prediction tap.

108. (Original) The data processing apparatus according to claim 107 wherein said predictive tap extraction means extracts said converted data showing position

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relationships indicating correlation with respect to data of interest larger than a preset threshold value as said prediction tap.

109. (Original) The data processing apparatus according to claim 107 wherein said predictive tap extraction means extracts said converted data showing position relationships indicating correlation with respect to data of interest within a preset rank value.

110. (Original) The data processing apparatus according to claim 100 wherein said tap coefficients have been acquired by learning, using said tap coefficients and the converted data, so that a prediction error of the prediction value of said original data obtained on preset predictive calculations will be statistically minimum.

111. (Original) The data processing apparatus according to claim 100 wherein said original data is picture data of a moving picture or a still picture.

112. (Original) A data processing method for processing block-based converted data, obtained on applying at least orthogonal transform or frequency transform to data in terms of a preset block as a unit, comprising the steps of:

- acquiring tap coefficients as found on learning;
- extracting said converted data used for predictive calculations for decoding data of a data block of interest among data blocks each of which is a block of said data, at least from a converted block as a block of said converted data, corresponding to a data block other than the data block of interest, to output the extracted data as prediction taps; and

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performing preset predictive calculations, using said tap coefficients and prediction taps, to decode the converted data to original data.

113. (Currently Amended) A computer-readable recording medium having recorded thereon a program executable by a processor for performing a method for having a computer execute data processing of processing block-based converted data, obtained on applying at least orthogonal transform or frequency transform to data in terms of a preset block as a unit, said program including the steps of method comprising:

acquiring tap coefficients as found on learning;

extracting said converted data used for predictive calculations for decoding data of a data block of interest among data blocks each of which is a block of said data, at least from a converted block as a block of said converted data, corresponding to a data block other than the data block of interest, to output the extracted data as prediction taps; and

performing preset predictive calculations, using said tap coefficients and prediction taps, to decode the converted data to original data.

114. (Withdrawn) A data processing apparatus for learning tap coefficients used for decoding, by predictive calculations, block-based converted data obtained at least on applying orthogonal or frequency transform to data in terms of a preset block as a unit, comprising:

generating means for generating pupil data as pupil, by at least applying orthogonal or frequency transform to teacher data as teacher;

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prediction tap extracting means for extracting said pupil data used for predictive calculations used for decoding teacher data of a teacher block of interest among teacher blocks each being a block of said teacher data, from at least a block of pupils as block of said pupil data corresponding to the teacher blocks other than the teacher block of interest, to output the extracted data as predictive taps; and

learning means for effecting learning so that predictive errors of the prediction values of said teacher data obtained on performing predictive calculations using the tap coefficients and the prediction taps will be statistically minimum to find tap coefficients.

115. (Withdrawn) The data processing apparatus according to claim 114 wherein said learning means effects learning so that a prediction error of the prediction value of said teacher data obtained on effecting linear predictive calculations using the tap coefficients and the pupil data will be statistically minimum.

116. (Withdrawn) The data processing apparatus according to claim 114 wherein said generating means at least discrete cosine transforms said teacher data to generate said pupil data.

117. (Withdrawn) The data processing apparatus according to claim 114 further comprising:

class tap extraction means for extracting said pupil data used for assigning teacher data of interest among said teacher data of said teacher blocks of interest to one of a plural number of classes to output the extracted data as class tap; and

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classification means for finding the class of said teacher data of interest, based on said class tap, by way of classification;

said learning means effecting learning so that a predictive error of the prediction value of said teacher data obtained on performing predictive calculations using the prediction taps and the tap coefficients corresponding to the class of said teacher data of interest will be statistically minimum to find tap coefficients.

118. (Withdrawn) The data processing apparatus according to claim 114 wherein said prediction tap extraction means extracts said pupil data as said prediction taps from said pupil blocks corresponding to teacher blocks neighboring to said teacher block of interest.

119. (Withdrawn) The data processing apparatus according to claim 114 wherein said prediction tap extraction means extracts said pupil data as said prediction taps from said pupil block corresponding to said teacher block of interest and from pupil blocks corresponding to teacher blocks other than said teacher block of interest.

120. (Withdrawn) The data processing apparatus according to claim 114 wherein said prediction tap extraction means extracts said pupil data showing position relationships indicating larger correlation with respect to teacher data of interest among teacher data of said teacher block of interest.

121. (Withdrawn) The data processing apparatus according to claim 120 wherein said prediction tap extraction means extracts said pupil data showing position

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relationships indicating correlation with respect to teacher data of interest not lower than a preset threshold value.

122. (Withdrawn) The data processing apparatus according to claim 120 wherein said prediction tap extraction means extracts said pupil data showing position relationships indicating correlation with respect to teacher data of interest within a preset of rank value.

123. (Withdrawn) The data processing apparatus according to claim 114 wherein said teacher data is data of a moving picture or a still picture.

124. (Withdrawn) A data processing method for learning tap coefficients used for decoding, by predictive calculations, block-based converted data obtained at least on applying orthogonal or frequency transform to data in terms of a preset block as a unit, comprising the steps of:

generating pupil data as pupil, by at least applying orthogonal or frequency transform to teacher data as teacher;

extracting said pupil data used for predictive calculations used for decoding teacher data of a teacher block of interest among teacher blocks each being a block of said teacher data, from at least a block of pupils as block of said pupil data corresponding to the teacher blocks other than the teacher block of interest, to output the extracted data as predictive taps; and

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effecting learning so that predictive errors of the prediction values of said teacher data obtained on performing predictive calculations using the tap coefficients and the prediction taps will be statistically minimum to find tap coefficients.

125. (Withdrawn – Currently Amended) A computer-readable recording medium having recorded thereon a program executable by a processor for performing a method for having a computer execute data processing of learning tap coefficients used for decoding, by predictive calculations, block-based converted data obtained at least on applying orthogonal or frequency transform to data in terms of a preset block as a unit, said ~~program including the steps of~~ method comprising:

generating pupil data as pupil, by at least applying orthogonal or frequency transform to teacher data as teacher:

extracting said pupil data used for predictive calculations used for decoding teacher data of a teacher block of interest among teacher blocks each being a block of said teacher data, from at least a block of pupils as block of said pupil data corresponding to the teacher block other than the teacher block of interest, to output the extracted data as predictive taps; and

effecting learning so that predictive errors of the prediction values of said teacher data obtained on performing predictive calculations using the tap coefficients and the prediction taps will be statistically minimum to find said tap coefficients.

126. (Withdrawn) A data processing apparatus for learning an extraction pattern of first data to be used as prediction taps used for predictive calculations when second

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data is to be acquired by predictive calculations using said prediction taps extracted from said first data and preset tap coefficients, comprising:

correlation calculating means for finding the correlation of said first data showing a preset position relationship with respect to second data lying in a preset position, said first and second data being used for learning said extraction pattern, from one said position relationship to another; and

setting means for setting the extraction pattern of said first data to be used as said prediction taps used for said predictive calculations executed for obtaining said second data, based on said correlation.

127. (Withdrawn) The data processing apparatus according to claim 126 wherein said correlation calculating means finds statistic correlation between said first data in a preset position relationship with respect to said second data lying in a preset position and said second data lying in the preset position.

128. (Withdrawn) The data processing apparatus according to claim 126 wherein said setting means sets the position pattern of said first data, showing a position relationship indicating a large value of said correlation, as said extraction pattern.

129. (Withdrawn) The data processing apparatus according to claim 126 wherein said setting means sets the position pattern of said first data, showing a position relationship indicating said correlation not less than a preset threshold value, as said extraction pattern.

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130. (Withdrawn) The data processing apparatus according to claim 126 wherein said setting means sets the position pattern of said first data showing a position relationship indicating said correlation within a preset rank value as said extraction pattern.

131. (Withdrawn) A data processing method for learning an extraction pattern of first data to be used as prediction taps used for predictive calculations when second data is to be acquired by predictive calculations using said prediction taps extracted from said first data and preset tap coefficients, comprising the steps of:

finding the correlation of said first data showing a preset position relationship with respect to second data lying in a preset position, said first and second data being used for learning said extraction pattern, from one said position relationship to another; and

setting the extraction pattern of said first data to be used as said prediction taps used for said predictive calculations executed for obtaining said second data, based on said correlation.

132. (Withdrawn - Currently Amended) A computer-readable recording medium having recorded thereon a program executable by a processor for performing a method for having a computer execute data processing of learning an extraction pattern of first data to be used as prediction taps used for predictive calculations when second data is to be acquired by predictive calculations using said prediction taps extracted from said first data and preset tap coefficients, said program including the steps of method comprising:

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finding the correlation of said first data showing a preset position relationship with respect to second data lying in a preset position, said first and second data being used for learning said extraction pattern, from one said position relationship to another; and

setting the extraction pattern of said first data to be used as said prediction taps used for said predictive calculations executed for obtaining said second data, based on said correlation.